



KINETICS AND EQUILIBRIUM STUDY OF NICKEL(II) REMOVAL USING PEAT MOSS

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Abstract

In this study, the removal of nickel(II) ions from aqueous solutions using peat moss sampled from Poiana Stampei (Romania) under different experimental conditions (different initial concentrations of metal ion and contact time) was investigated, in batch experiments. The kinetics of adsorption process was followed based on the amount of nickel(II) ions retained at various time intervals, and the experimental results were analyzed using three kinetic models: pseudo-first order, pseudo-second order and intra-particle diffusion models. The rate constants of adsorption process for all these kinetic models were calculated. Good correlation coefficients were obtained for the pseudo-second order kinetic model, showing that nickel(II) uptake process followed the pseudo-second order rate expression. Adsorption isotherms were expressed by Langmuir and Freundlich adsorption models. The Langmuir model fit the experimental data with high correlation coefficient and better than Freundlich model and the maximum adsorption capacity was obtained as 32.89 mg/g, at 65 °C. The effect of temperature on nickel(II) adsorption process was also investigated and various thermodynamic parameters (ΔG , ΔH and ΔS) have been calculated.

Key words: adsorption, equilibrium isotherm, kinetics, nickel(II) ions, peat moss

Received: April, 2009; *Revised final:* April 2010; *Accepted:* May, 2010

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